elmi Ltd.
laboratory equipment

December 04

Intelli-Mixer RM-2
Service manual

ISO 9001:2000

ELMI Ltd.
21-133 Aizkraukles Str.
Riga LV-1006, Latvia
Phone: +371 755 8743
Fax: +371 755 1934
Email: info@elmi-tech.com
WEB: www.elmi-tech.com

elmi Ltd.
laboratory equipment

Table of contents

1. Introduction 3
2. Specification 3
3. Elements of construction 4
4. Disassembly and part list 5
    4.1 Disassembly 5
    4.2 Part list 6
5. Trouble shooting 7
    5.1 Mechanical trouble shooting 7
    5.2 Electronic trouble shooting 8
6. Block diagrams 10
    6.1.1 RM2B Mounting diagram 10
    6.1.2 RM2B Principal electronic diagram 11
    6.2.1 RM2C Mounting diagram 12
    6.2.2 RM2C Principal electronic diagram 13

elmi Ltd.
laboratory equipment

1. Introduction

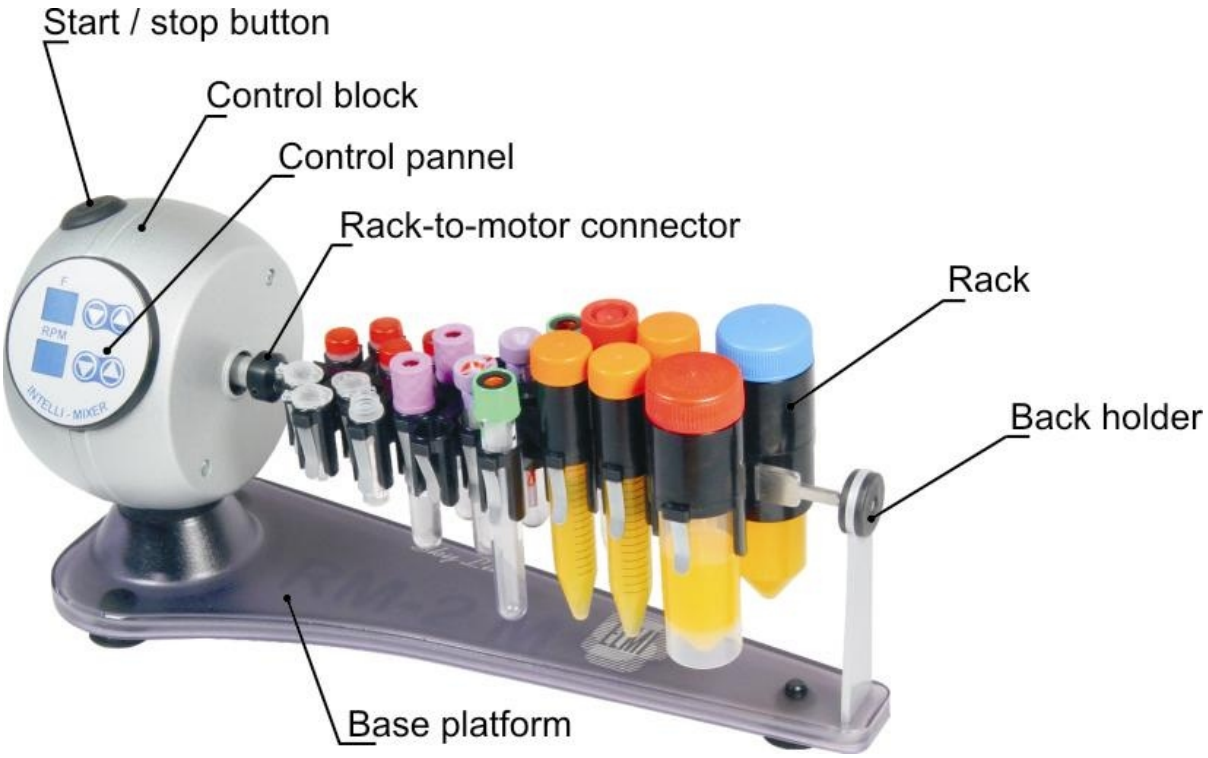
INTELLI-MIXER RM-2 is a combination of variable speed rotator, advanced multiple tube vortex in one machine. Vast selection of racks and operation regimes allow to accommodate the mixer for virtually any kind of mixing from gentle low speed hybridization up to strong test tube vortexing in a whole range of tubes from 0.5ml up to 50ml. Superior performance and flexibility allows to mix almost any kind of laboratory samples of any dencity with amazing efficiency. It also allows to program up to 3 personal custom regimes by user to insure always the best up to date functionality.

2. Specification

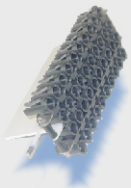
Variable rotation speed, rev./min.:	from 1 to 99
Speed selection step, rev./min.	1
Environmental temperature, C:	from +2 to + 50
Relative moisture of the atmosphere (at the temp. +20 C):	no more than 80 %
Power adapter input:	110-220 V; 50 Hz
Power adapter output:	12VDC, 1000 mA
Power consumption, W:	no more than 12
Size of equipment (length x width x height) mm:	432 x 177 x 168
Weight, kg:	1,6

Test tube diameters / RM-2 Models	Number of test tubes in the rack		
	RM-2S 315mm	RM-2M 340mm	RM-2L 420mm
8-11 mm	28	32	42
13 mm	24	28	38
16 mm	14	16	22
30 mm	8	10	14

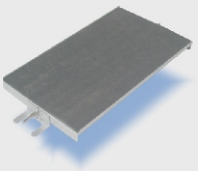
3. Elements of construction.



ACCESSORIES



Rack for 8-10 x 120mm long tubes.



Rocking platform.

Up to 12x30mm places Blotting and Hybridization rack.

Up to 14x 30mm places

Up to 22x 16mm places

Up to 38x 13mm places

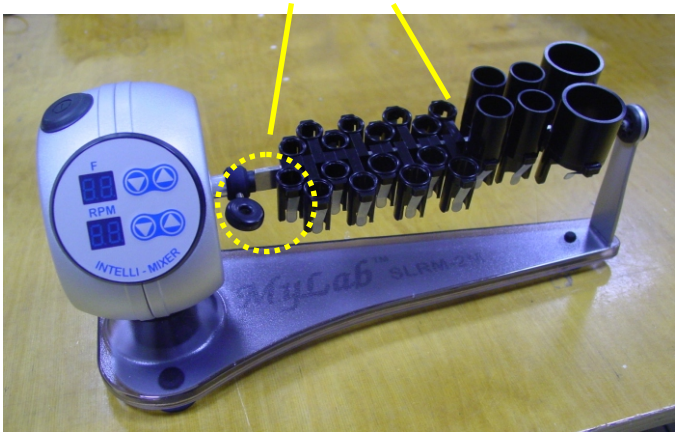
Up to 42x 11mm places

11, 13, 16, 30 (mm) combined rack

4. Disassembly and part list.
4.1 Disassembly.

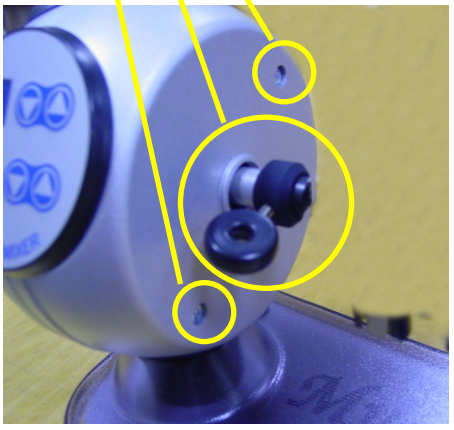
Unscrew the rack fixation and take the rack away.

1



Unscrew the control block's screws from both sides of the block and take away rack fixation ring.

2

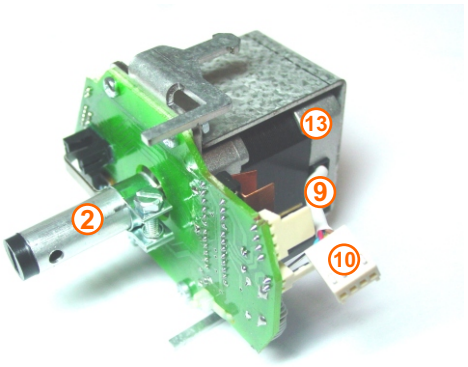


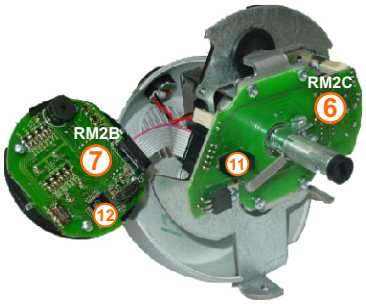
Take both hemisphere casing covers away.
Now the intelli-Mixer is disassembled for internal repair.

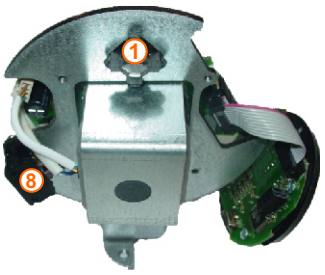
3

elmi Ltd.
laboratory equipment

4.2 Part list.







Index

1. Motor suspension.
2. Motor aluminum bushing.
3. Control block casing.
4. Rack fixation ring.
5. Control block fixation bolts.
6. RM2C board.
7. RM2B board.
8. Power supply socket.
9. Motor wires.
10. Wire connectors.
11. Optical sensor.
12. Microprocessor.
13. Motor.
14. Buttons.
14. Indicators.

5. Trouble shooting.
5.1 Mechanical.

#	Symptom	Possible causes	Corrective action
1	Rough sound of friction resulting either motor halt or incorrect operation of the device.	Shock absorbers of the motor mount are displaced from the landing places [1].	A) Take the control block hemisphere casings off [3]. B) Put shock absorbers back to places [1].
		Because of the incorrect rack removal the aluminum bushing has been shifted [2].	A) Unscrew and remove the half-sphere control block casing parts [3]. B) Set the bushing of the rack in the appropriate position [2]. Make sure that the rack is tightened in the bushing and the rack is in the horizontal position.
2	Strong radial vibration of the rack (accompanying with sharp noise)	The rack is positioned incorrectly inside the bushing [2].	A) Free up the rack fixation bolt [4]. B) Position the rack inside the bushing in a parallel way [2]. C) Keeping this rack position, tighten the racks fixation bolt [4].
		The rack is mechanically damaged, the aluminum baseline of the rack is bended.	Exchange the rack.
3	Noise and scratches uncommon for the normal operation of the mixer.	Accidental shifting of the control block casing hemisphere parts. Could be resulted by heavy transportation [2].	Fix the control block casing hemispheres back and tighten the bolts [5]. Make sure that the rack is pointing right in the middle of the hole.
4	Rack is periodically goes out of the bushing or shifts away [2].	The thread of rack fixing ring is broken [4].	Exchange the rack fixation ring [4].

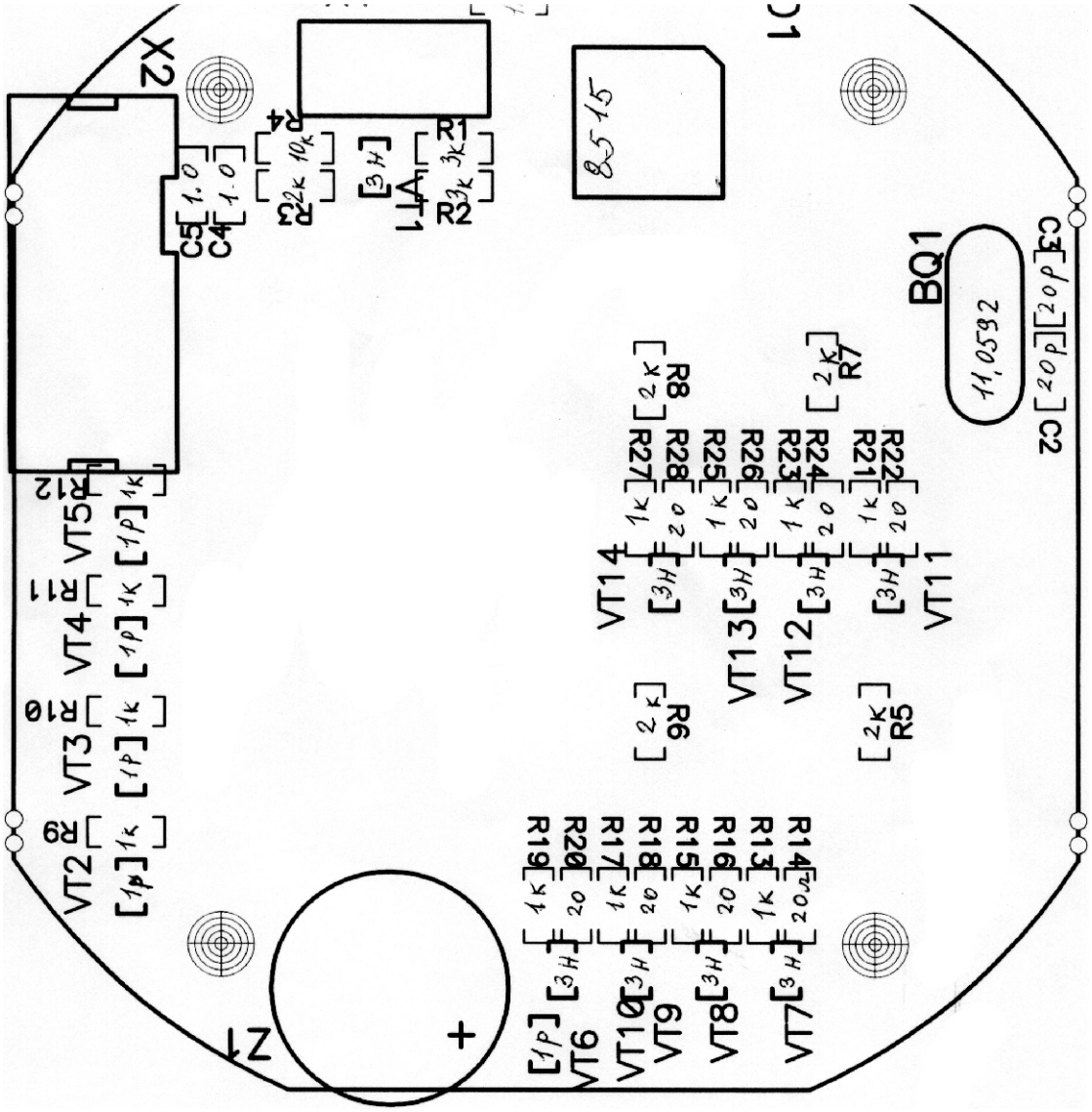
5. Trouble shooting.
5.2 Electronic.

#	Symptom	Possible causes	Corrective action
1	Rack does not rotate, indicators [15] does not shine, control buttons [14] does not work.	Power adapter is out of order, power adapters cord is broken.	Try connecting the analogues adapter of find an alternative power supply. If the power supply was the reason replace it with a new one.
		There is bad connection in the power input socket or a mechanical damage of the socket [8].	Try to fix the power socket or exchange it [8].
		Some element on the RM2B board is out of order [7].	Check the elements related to power supply on the board, check the electronic lines of the board. If all mentioned is in order, check the +5Volt voltage on the reset pin. Check if the quartz is generating. If it is not generating and heating it self then it is necessary to replace RM2B board [7].
2	Rack does not rotate. Indicators are working. While pressing control buttons [14] it is beeping, indicator figures are changing [15].	Motor is out of order or motor wires [9] are broken or wire connectors are out of order [10].	Check motor, wires [9] and connectors of the motor [10] and exchange the broken elements.
		RM2C board or some of its elements are out of order [6].	Replace the board or necessary elements [6].
3	While turning on the mixer, rack is rotating but does not find the horizontal default position.	Optical sensor problem [11].	Using the oscillograph check the signal transition between the optical sensor [11] and the microprocessor [12]. Exchange the broken elements.

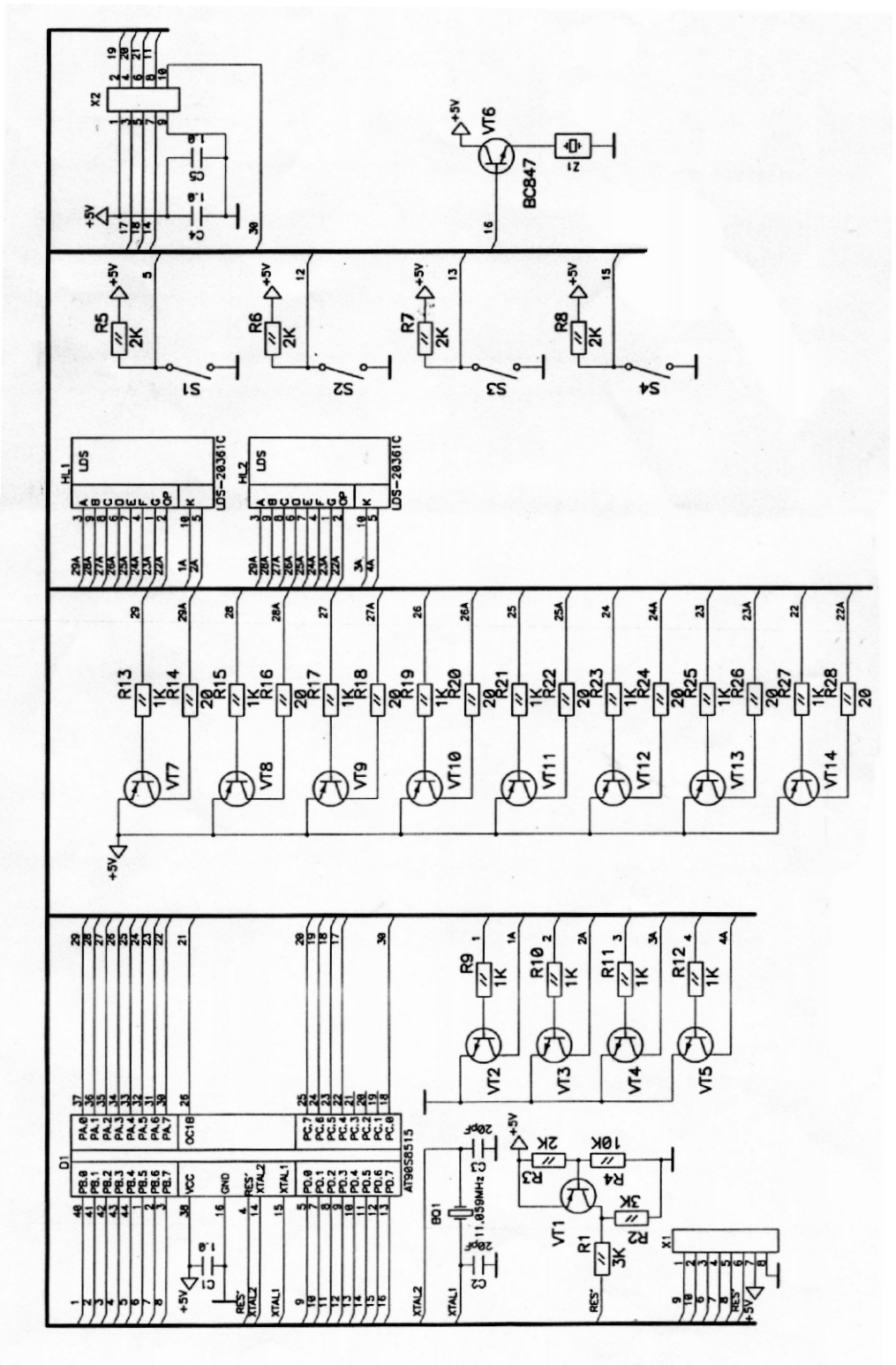
5. Trouble shooting.
5.2 Electronic.

4	Rack rotation is unstable.	One of the wires of the motor is broken [9].	Replace the motor [13].
		Wire connectors of the motor has no connection [10].	Replace the connectors [10].
		RM2C board is out of order [6].	Replace RM2C board [6].
5	One or more buttons does not respond on pressing [14].	Button is mechanically broken [14].	Replace the button [14].
		Processor is out of order [12].	Replace the RM2B board [7].
6	Indicator or some of its segments does not emit light.	RM2B board is out of order [7].	Replace the RM2B board [7].

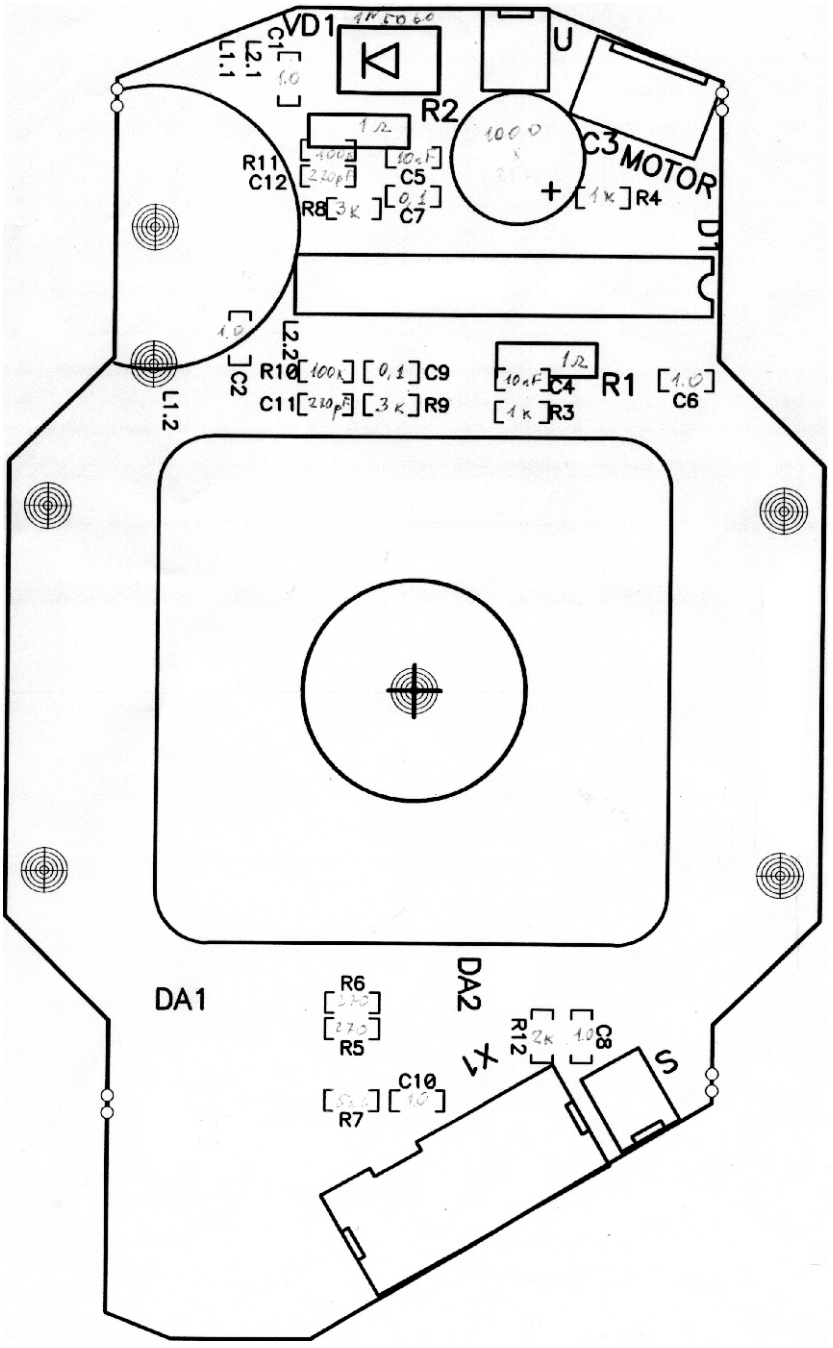
6. Block diagrams.
6.1.1 RM2B mounting diagram.



6. Block diagrams.
6.1.2 RM2B Principal electronic diagram.



6. Block diagrams.
6.2.1 RM2C mounting diagram.



6. Block diagrams.
6.2.2 RM2C Principal electronic diagram.